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Acute Limb Ischemia in Pregnancy (Case Report): Challenges and Prospects

S. LAMSYAH, A. BENAMER, N. MAMOUNI, M. SASSI, M. BENDAHHOU IDRISSI, S ERRARHAY, C BOUCHIKHI, A. BANANI

Obstetrics gynecology department I University hospital Hassan II Fez

Abstract*: Background: Acute limb ischemia (ALI) during pregnancy is a rare yet critical condition, presenting unique management challenges. This case report illustrates the complexities involved in diagnosing and treating ALI in a pregnant patient. Case Presentation: A 33-year-old pregnant woman experienced sudden severe limb pain and sensory deficits, prompting evaluation for a thromboembolic event. Imaging studies were complicated by concerns regarding radiation exposure and contrast agent safety. Management: A multidisciplinary team of obstetricians, vascular surgeons, and anesthesiologists coordinated care. The patient received anticoagulation and underwent thrombectomy, with careful anesthetic management to ensure maternal and fetal safety. Challenges and Prospects: challenges included balancing rapid intervention with safety and coordinating care among specialties. This case highlights the need for standardized protocols and enhanced provider education to improve outcomes for pregnant patients with ALI. Conclusion: Effective management of ALI in pregnancy requires a collaborative approach, emphasizing the importance of prompt diagnosis and treatment while safeguarding maternal and fetal health.*

Keywords: Acute limb ischemia, pregnancy, thrombectomy, multidisciplinary managemnt, maternal health, fetal safety.

1. INTRODUCTION

Acute limb ischemia (ALI) during pregnancy is a rare but critical condition that poses significant risks to both maternal and fetal health. Characterized by the sudden reduction or loss of blood flow to the limbs, ALI can result from various underlying causes, including thrombosis, embolism, and vascular compression. Pregnancy itself introduces a complex interplay of physiological changes—such as increased blood volume, altered coagulation, and hormonal fluctuations—that can heighten the risk of vascular complications. This article aims to explore the etiology, clinical presentation, diagnostic challenges, and management strategies for acute limb ischemia in pregnant women, highlighting the importance of timely intervention to prevent serious morbidity and mortality. Through a comprehensive review of existing literature and case studies, we seek to enhance awareness among healthcare providers and improve outcomes for affected patients.

2. CLINICAL CASE

The patient is a 33-year-old multiparous woman (with previous vaginal deliveries), pregnant at 33 weeks of amenorrhea, who underwent mitral valve replacement 11 years ago and has been on long-term anticoagulation therapy with poor adherence and inadequate monitoring. She also has a history of a Sylvian stroke three years ago, of cardioembolic origin.

She was admitted for the management of a cold, heavy, and painful lower limb.

- General assessment: the patient is stable hemodynamically and respiratory-wise, apyretic, with normocolored conjunctiva.
- Cardiovascular assessment: prosthetic click at the mitral focus, absence of congestive signs.
  The left lower limb is cold, painful, discolored (Fig. 1), with absent femoral, posterior tibial, popliteal, and pedal pulses, and the onset of tingling.
- Obstetric assessment: the clinical examination revealed a uterus elongated longitudinally, with a uterine height normal for the gestational age, positive and regular fetal heart sounds. The patient is not in labor, and the amniotic sac is intact.
- The rest of the clinical examination is unremarkable.

The obstetric ultrasound revealed a viable singleton pregnancy, with an estimated fetal weight corresponding to the gestational age, a homogeneous fundal placenta, and a normal amount of amniotic fluid.

Given the strong suspicion of acute limb ischemia, a **CT angiography was requested** (with a single acquisition) (Fig. 2), which revealed a total occlusion of the common iliac artery 15 millimeters from its origin, with reconstitution at the anterior and posterior trunks of the internal iliac artery. Additionally, there was a total occlusion of the retro-articular popliteal artery, with distal reconstitution via the peroneal artery and the upper third of the anterior tibial artery, followed by its re-occlusion.

Total occlusion of the posterior tibial artery without distal reconstitution.

The patient was admitted to the operating room, under antibiotic prophylaxis and unfractionated heparin therapy. The procedure lasted 2 hours and involved a thrombectomy of the left common iliac artery through a Scarpa approach (Fig. 3), as well as a thrombectomy of the popliteal artery via a tibial approach (Fig. 4).

The removed thrombi were sent for pathological examination to support the etiological diagnosis and rule out a septic origin, which was refuted following the pathological study results.

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The patient was extubated after the procedure and transferred to the intensive care unit.

She underwent transesophageal echocardiography, which revealed a mechanical valve in the mitral position with reduced movement of one leaflet, as well as a very mobile mass on the mechanical valve suggestive of either a thrombus or vegetation, with a free left atrial appendage.

The patient was placed on unfractionated heparin via a continuous infusion during the acute phase, followed by oral anticoagulation, resulting in good clinical progression, aiming to switch it to an intravenous medication after deciding to time of delivery.

During her stay in the intensive care unit, from an obstetric perspective, she received daily monitoring of fetal heart rate.

Three weeks later, we performed a cesarean section after stopping the heparin, and a control of the activated coagulation time (ACT) which was normal. The cesarean was carried out without incident, resulting in the delivery of a healthy newborn who adapted well to life outside the womb, and we performed a tubal ligation after obtaining the patient's consent, in consultation with the cardiologists who deemed that a new pregnancy was contraindicated given the patient's condition.

The postpartum recovery was uneventful, and heparin was resumed after the acute phase of the postpartum period.

Fig. 1. *Clinical examination revealed skin discoloration.*

Fig. 2. *CT angiography.*

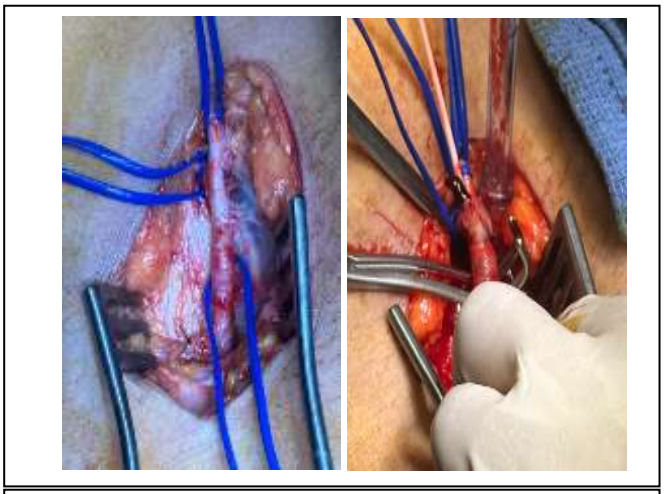

Fig. 3.*Thrombectomy of the left common iliac artery*

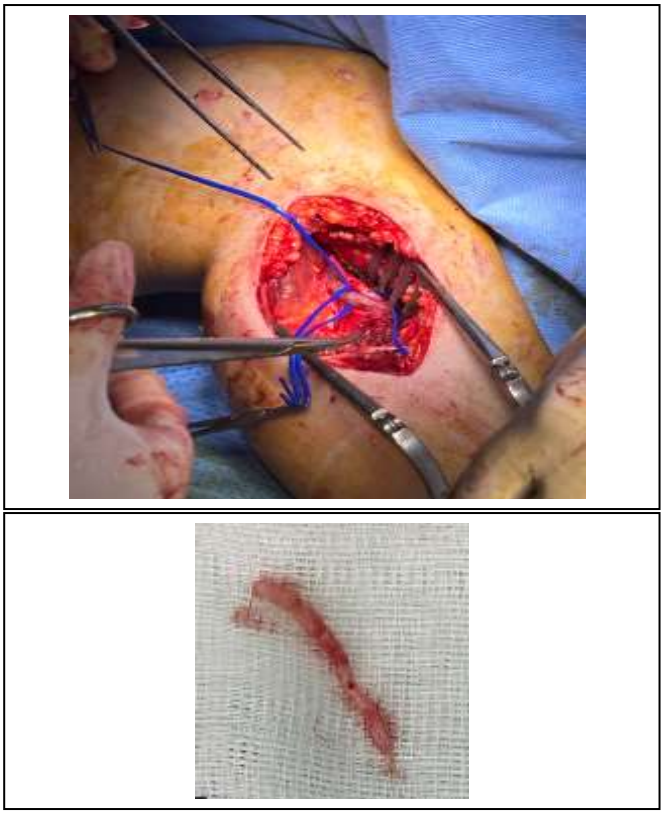

Fig. 4.*Thrombectomy of the left common iliac artery*

3. DISCUSSION

Acute limb ischemia in pregnant women with prosthetic valves represents a complex clinical challenge. This condition underscores the need for a multidisciplinary approach integrating obstetric, cardiological and vascular care.

3.1 Underlying mechanisms

The physiological changes of pregnancy, including increased blood volume and changes in coagulation factors, create an environment conducive to thrombosis.
Women with valve prostheses are particularly vulnerable because of the need for anticoagulation to prevent thromboembolic events.
However, necessary adjustments to anticoagulant therapy during pregnancy can complicate risk management. Studies show that instability of anticoagulant balance can promote clot formation, increasing the risk of ischemia. [1]

3.2 Diagnostic challenges

Early diagnosis of acute limb ischemia is crucial to improving clinical outcomes. However, symptoms may be non-specific and mimic other conditions common during pregnancy. This calls for extra vigilance on the part of clinicians.
Non-invasive imaging tools, such as Doppler ultrasonography, should be favored, if their contribution to establishing the diagnosis allows.
Close collaboration between obstetricians and vascular specialists can facilitate rapid and accurate assessment.
Angioscanner (or CT angiography) is a valuable imaging tool for diagnosing acute limb ischemia. However, its use during pregnancy presents several specific challenges that must be taken into account to ensure the safety of both mother and fetus. [2]

3.2.1 Radiation exposure:

One of the main challenges of angioscanner is radiation exposure, which can pose risks to the fetus, particularly during the early stages of pregnancy. Although exposure levels are generally considered safe, there are concerns about the long-term effects of radiation on fetal development, including potential risks of birth defects and childhood cancers.

3.2.2 Use of contrast agent:

Contrast agents used in angioscanners may also present risks. Although most iodinated contrast agents are generally considered safe, their use in pregnant women needs to be carefully weighed. Concerns include allergic reactions and potential effects on renal function, which may affect both mother and fetus.

3.2.3 Limited mobility:

Pregnancy can complicate the patient's position and mobility during angioscanning. Pregnant women may find it difficult to remain still in a comfortable position, which can compromise the quality of the images obtained. In addition, patients may need extra support to move around, especially if they are suffering from pain due to ischemia.

3.2.4 Interpreting results:

Pregnancy-related physiological changes may influence the interpretation of angioscanner results. For example, increased blood volume and changes in blood flow may result in findings that are not necessarily indicative of vascular pathology. Clinicians need to be aware of these variables when analyzing images to avoid misdiagnosis.

3.3 Treatment strategies

The management of acute limb ischemia during pregnancy requires a multidisciplinary approach. Medical treatments, such as anticoagulation, must be carefully adjusted to balance the risks and benefits for both mother and fetus. Low-molecular-weight heparin is often the treatment of choice, but specific protocols must be established for each patient, taking into account her general state of health and the progress of the pregnancy.
If conservative treatment fails, or is not possible, surgery may be necessary. However, surgery during pregnancy entails increased risks, notably due to anesthetic considerations and potential impact on the pregnancy. A rigorous risk-benefit assessment must guide the decision to undergo surgery.

3.4 Challenges of surgery in pregnancy

Thrombectomy to treat acute limb ischemia in a pregnant patient is a complex procedure that presents several unique challenges.
These challenges must be addressed to ensure safe and effective treatment, while protecting the health of the mother and fetus. [3]

3.4.1 Anesthetic considerations:

Anesthesia during pregnancy requires special attention. Physiological modifications, such as increased blood volume and changes in lung function, can influence the response to anesthesia. [4]
The choice of anesthesia (regional vs. general) must be carefully weighed to minimize risks to the fetus. Anesthetists must also be prepared to manage potential complications, such as hypotension or respiratory problems.

- Prior assessment: A full assessment of the patient's health is essential. It is important to know the patient's medical history, including potential obstetrical complications.
- Choice of anesthesia: Regional anesthesia (such as epidural) is often preferred to minimize risks to the fetus. General anesthesia may be considered in emergency cases, but should be used with caution.

3.4.2 Increased thrombo-embolic risk:

Pregnant women are already at increased risk of thrombosis due to the hypercoagulable state associated with pregnancy. Thrombectomy can lead to thromboembolic complications,

including the release of thrombus fragments into the circulation. Careful monitoring is required to detect any signs of post-operative complications, both in the mother and the fetus.

3.4.3 Complex pre-operative assessment :

Preoperative assessment of pregnant patients must be comprehensive. This includes an assessment of medical history, thromboembolic risk factors, and potential pregnancy complications. Planning must also take into account the stage of pregnancy, as risks and benefits can vary considerably between the first, second and third trimesters.

3.4.4 Impact on pregnancy and fetus :

Thrombectomy and associated care may disrupt the normal course of pregnancy. The risks of preterm labor, hemorrhage or other obstetrical complications must be carefully assessed and managed. Medical teams must also be prepared for scenarios where obstetric intervention may be required, depending on the patient's clinical course.

3.4.5 Multi-disciplinary complexity:

The management of pregnant patients requiring thrombectomy involves close collaboration between several specialties, including vascular surgery, obstetrics and anesthesia. Coordination between these teams is essential to ensure consistent, safe management. Clear communication and decision-making protocols must be established to facilitate this collaboration.

3.5 Post-operative follow-up :

Post-operative follow-up is particularly crucial in pregnant patients. Clinicians should carefully monitor limb perfusion, signs of infection, and thromboembolic complications. In addition, regular assessment of fetal health is necessary to ensure that no deterioration has occurred as a result of surgery or anesthesia.

3.6 Psychological considerations:

Pregnant women face increased levels of stress due to the pregnancy itself, and the diagnosis of a vascular complication can exacerbate this anxiety. It is therefore important to integrate psychological support into management. Providing patients with clear, reassuring information about their condition and treatment options can help to alleviate anxiety and improve adherence to treatment recommendations.

3.7 Research and continuing education :

To improve the management of acute limb ischemia in pregnancy, it is essential to promote best-practice research and develop evidence-based clinical protocols. In addition, ongoing education of healthcare professionals on the risks, diagnosis and management of AMI in pregnancy is crucial to optimize patient outcomes.

4. Conclusion

In conclusion, this case report on acute limb ischemia in pregnancy underscores the critical challenges faced in diagnosing and managing this rare but serious condition. The interplay between physiological changes during pregnancy and underlying vascular issues can complicate timely intervention. Our findings highlight the importance of a multidisciplinary approach, combining obstetric care with vascular expertise, to optimize outcomes for both mother and fetus. As we navigate the complexities of such cases, ongoing research and improved awareness are essential to enhance clinical practices and inform guidelines. This case serves as a reminder of the need for vigilance in recognizing atypical presentations in pregnant patients, ultimately aiming to improve prognostic prospects and patient care.

5. References

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